

THE THORACIC STRUCTURE OF PSEUDOGYNES OF
FORMICA SANGUINEA LATREILLE (HYMEN-
OPTERA, FORMICIDAE).

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Forms intermediate between the winged queen and wingless worker have been reported from colonies of *F. sanguinea* infested by Staphylinid beetles of the genera *Lomechusa*, *Atemeles*, and *Xenodusa* by Wasmann,¹ who proposed the term "pseudogyne" to include these anomalous individuals. Later² he distinguished three classes of pseudogynes: micro- and mesopseudogynes which are small or medium-sized with convex or humped mesonotal areas but without wings, and macropseudogynes, which resemble the normal females but have short or vestigial wings. The purpose of this paper is to record the thoracic changes which have accompanied the development of the apterous condition in this species.

The specimens of this series were studied in a liquid medium (water and glycerine) with the aid of a binocular microscope. The scale drawings were made with the aid of a cross-line ocular micrometer disc and graph paper. The specimens were made available through the generosity of the late Professor William M. Wheeler.

The winged queen and the wingless worker are the usual female forms present in the colony of *F. sanguinea*. The thorax of the female (Fig. 1) is characterized by the presence of a well-developed mesothorax which accommodates the large muscles used in the movement of the mesothoracic wings. The metathorax is reduced in size as are the metathoracic wings. The thorax of the worker (Fig. 8) is only a fraction of the size of that of the queen and exhibits an almost complete fusion of parts. The pronotum is the only region which maintains its identity.

The intermediate forms or pseudogynes illustrate the progressive changes that accompany the transition from the alate to the apterous condition. The first change is a general reduction in size and a partial fusion of the sclerites in the mesonotal and mesopleural re-

¹ 1895. Die ergatogynen Formen bei den Ameisen und ihre Erklarung. *Biol. Centralbl.* 15: 606-646.

² 1909. Zur Kenntniss der Ameisen und Ameisengaste von Luxemburg. III. Verzeichniss der Ameisen von Luxemburg mit biologischen Notizen. *Arch. Trimestr. Inst. Gr. Duc. Luxemb. n.s.* 4: 1-103, 5 pls.

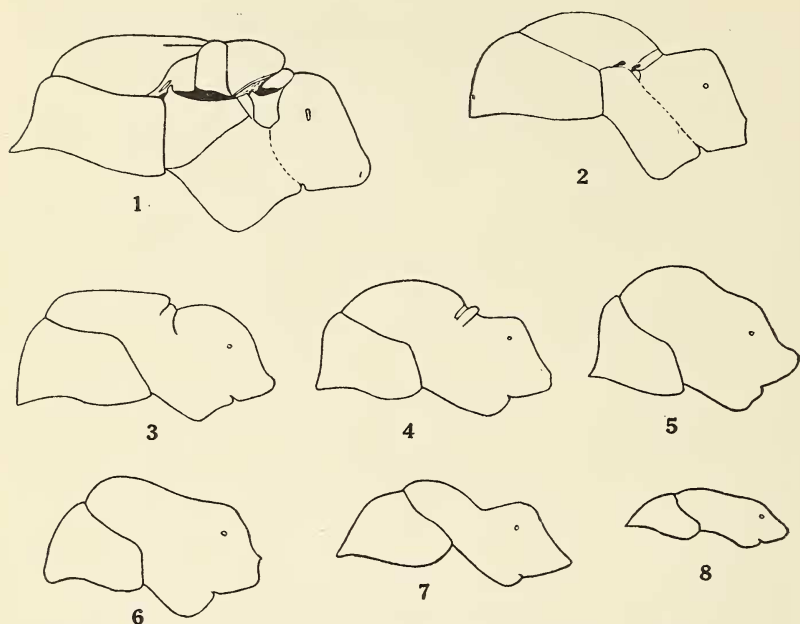


Fig. 1. Thorax of *F. sanguinea* queen (wings removed). Figs. 2-7. Thoraces of pseudogynes. Fig. 8. Thorax of worker.

gions accompanied by a reduction of the wings to vestiges (Fig. 2). This is followed by a partial fusion of the mesothorax with the metathorax both in the notal and pleural regions accompanied by a further reduction in size (Figs. 3, 4). A further step is the complete fusion of the mesothorax with the metathorax (Fig. 5). Final steps in the progressive change is a reduction in size (Figs. 6, 7) approaching the condition found in the worker (Fig. 8). The tendency for the forms to blend into one another indicates that the division into three categories by Wasmann,³ using thoracic characters, is an arbitrary one.

Wasmann³ suggested that the presence of these pseudogynes was due indirectly to the activities of the Staphylinid beetles. The larvae of these beetles are predacious forms which devour the ant larvae. He postulated that the worker ants in an endeavor to maintain the normal proportions of queens and workers attempt to convert queen larvae into workers (micro- and mesopseudogynes) or worker larvae into queens (macropseudogynes). The absence of

³ *Loc. cit.*, 1909.

pseudogynes in some infested *F. sanguinea* colonies and their presence in other infested colonies.^{4, 5} weakens this trophogenic explanation of pseudogyne production. A more tenable explanation is that these forms are "intercastes" as the discovery of gynergates (a lateral mosaic female-worker anomaly) by Tulloch⁶ and Wheeler⁷ offers strong evidence to support the theory that in the ants the worker and queen castes are germinally determined.

Insects in Killdeer Stomach.—A killdeer, *Oxyechus vociferus vociferus* (Linn.), was collected on the edge of a pond approximately one and one-half miles northwest of Dolomite, in Tooele County, Utah, August 4, 1941. Twenty minutes later the stomach (gizzard) was removed from the dead bird and placed on a square of gauze, while the collection data was being written on a tag, before preservation of the stomach in alcohol. The writer was surprised to see a very large living Tabanidae larva, undoubtedly *Tabanus punctifer* O.S., the largest species occurring in this area, issuing from the oesophageal opening of the removed stomach. Two living larvae, Stratiomyiidae (Det. Dr. A. Peterson), also had partially emerged from the same opening. Additional contents consisted of 7 smaller Tabanidae larvae (*Chrysops fulvaster* adults were extremely abundant in this area at the time and for at least three weeks thereafter), 13 Stratiomyiidae larvae, 9 Chironomidae larvae, 6 larval and 1 adult Trichoptera, 7 Corixidae, 3 Notonectidae, 1 leafhopper, *Cicadella hieroglyphica* Say, 2 larval Lepidoptera, 2 ants, and 1 Odonata, a damsel fly. The stomach also contained 1 spider, 9 Crustacea, and numerous unidentified insect fragments. This stomach was unusually large and full.—GEORGE F. KNOWLTON, Utah Agricultural Experiment Station, Logan.

⁴ Wheeler, W. M. 1910. *Ants: Their Structure, Development and Behavior*. Columbia University Press, N. Y.

⁵ Wheeler, W. M. 1937. *Mosaics and Other Anomalies Among Ants*. Harvard University Press, Cambridge, Mass.

⁶ 1932. A Gynergate of *Myrmecia*. *Psyche* 39: 48-51, 3 figs.

⁷ *Loc. cit.*, 1937.